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UNPAID WORK AND THE AUSTRALIAN ECONOMY
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PREFACE

In 1990 the ABS published a set of experimental estimates of the value of unpaid work for Australia. Data from the Pilot Time Use Survey of 1987, which was conducted in the Sydney Statistical Division, were used as a basis for the estimates. This paper presents a second set of estimates of unpaid work for Australia based on the results of the 1992 national Time Use Survey.

The 1968 version of the United Nations, *A System of National Accounts* (SNA) has been under review over recent years to better reflect evolving institutional and policy concerns. The revision was completed with the recent publication of a revised SNA (commonly referred to as the "1993 SNA").

One issue which was considered in the review of the SNA was whether to include the estimated value of unpaid work, a traditional exclusion, within estimates of gross domestic product (GDP). The 1993 SNA continues to exclude unpaid work from the boundary of production within the core of its system. However, it recommends that estimates of unpaid work be incorporated into an expanded boundary of production via "satellite accounts". (Satellite accounts are accounting statements which are separate from, but consistent with, the core national accounts.) Australia is working towards producing such accounts as data and resources permit.

In addition, there is interest in valuing unpaid work in its own right for several reasons, including:

- (a) to facilitate analyses of the composition of unpaid work by type, by sex, by population characteristics, etc; and
- (b) for use as a point of comparison with the market economy.

At present there is neither international consensus as to which domestic and volunteer and community activities precisely constitute unpaid work nor on what methods should be used to value it. However, Australia is contributing to the process of developing international classification standards in this area. It is hoped that by 1997, when Australia intends to conduct its next Time Use Survey, a consensus will have emerged regarding these standards. The estimates of unpaid work developed for 1992 in this paper may then be revised to reflect this consensus.

This paper includes some international comparisons of the value of unpaid work but they should be treated with caution for the reasons set out in the previous paragraph.

The terminology used in this Occasional Paper for total unpaid work differs from that used in the Information Paper (5236.0) published in 1990. In 5236.0 "unpaid household work" was the term used to refer to what is called "total unpaid work" in 5240.0. It is considered that the modified terminology used in this Occasional Paper is less likely to be misinterpreted. "Total unpaid work" is now defined as the sum of "unpaid household work: domestic activities, childcare, and purchasing goods and services" and "volunteer and community work".

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UNPAID WORK AND THE AUSTRALIAN ECONOMY

1. Introduction

This paper discusses the valuation of unpaid household work and volunteer and community work, generally termed "total unpaid work (or production)", in Australia. These activities constitute the major part of the (so-called) non-market sector which, together with the market sector, encompasses the total economy of a nation. This part of the non-market sector deploys without pay a large amount of human labour for the production of goods and services which are directly consumed by households without going through the market. Although these activities are "productive" in the broad sense of the term, they are, with some exceptions, not included within the main production boundary of the 1993 *System of National Accounts* (1993 SNA). Therefore, they are not recorded in the national accounts and the workers involved are not recorded in labour statistics unless they are in paid employment as well. Accordingly, until recently, the non-market sector has been given little prominence.

It is acknowledged, however, that institutional and labour market related changes may result in the shift of activities into (and out of) the market sector over time. Recent trends in labour force behaviour, in particular increased female participation, have resulted in a trend towards some substitution of market alternatives for unpaid work. Examples are take away meals, partially prepared meals and child care. In the opposite direction, however, greater investment in household capital, for example, microwave ovens, washing machines and clothes dryers, has permitted substitution of market alternatives by unpaid household work.¹ Moreover, in accordance with changes in the business cycle, there can be a shift of labour from/to the market sector to/from the non-market sector. Changes in gross domestic product (GDP) over time need to be viewed in the context of such developments.

Issues of definition, scope, data sources, the theoretical framework for valuation of total unpaid work and actual estimation methods used are discussed in this paper. Estimates of the value of such work for Australia for calendar year 1992 are presented. This study extends and refines similar estimates for 1986-87 produced by the ABS in 1990 and provides a comparison of the two sets of results. The relationship of total unpaid work to the national accounts is also considered and some international comparisons are provided.

2. Summary and analysis of results

Summary statistics for the value of unpaid household work, volunteer and community work and total unpaid work are shown in Table A. In the absence of international standards specifying a preferred "input" method of estimating unpaid household work, the ABS has adopted the *individual function replacement cost* method, using the persons' wage rate. Using this method the value of total unpaid work in Australia for 1992 is estimated to be \$227.8 billion. Other input methods were used for comparative purposes. These methods yielded results for the value of total unpaid work ranging from \$206.2 billion for the *net opportunity cost* method to \$272.3 billion for the *gross opportunity cost* method. The results reflect the fact that the average hourly persons' wage rate for the *individual function replacement cost* method was \$12.17, while the corresponding figures for the other methods were \$14.34 for the *gross opportunity cost* method, \$11.14 for the *housekeeper replacement cost* method and \$10.87 for the *net opportunity cost* method.

Accordingly, the ratios of these estimates relative to GDP, also shown in Table A below, reflect the results above. The ratio of the value of total unpaid work to GDP for the *individual function replacement cost* method was 58 per cent. The other methods ranged from 52 per cent for the *net opportunity cost* method to 69 per cent for the *gross opportunity cost* method.

The detailed tables for each valuation method for unpaid household work in Australia are presented in Tables 1-4 (pages 16 to 17). Estimates for volunteer and community work are shown in Tables 5-7 (page 18).

TABLE A: VALUE OF UNPAID WORK — SUMMARY

Estimation Method	Value of domestic activities, child care and purchasing goods and services (\$ billion)	Value of volunteer and community work (\$ billion)	Value of total unpaid work (\$ billion)	Female contribution (per cent)	Ratio of value of total unpaid work to gross domestic product (per cent)
Individual Function Replacement Cost	209.7	(a)18.1	227.8	65	58
Housekeeper Replacement Cost	195.5	(a)18.1	213.6	66	54
Opportunity Cost — Gross	251.0	21.3	272.3	66	69
Opportunity Cost — Net	190.2	16.0	206.2	66	52

(a) As is discussed in Section 7.2, estimates of the value of volunteer and community work using the *individual function replacement cost* method have been used with the *housekeeper replacement cost* method for comparison with the other methodologies used to estimate the value of total unpaid work.

3. Gender share in total unpaid work

Females were the main contributors to total unpaid work. They were estimated to contribute just under two thirds of the dollar value of total unpaid work, 65 per cent of the *individual function replacement cost* method estimate, and 66 per cent of each of the *housekeeper replacement cost* method, the *net opportunity cost* method and the *gross opportunity cost* method. Females contributed a greater share of all hours devoted to unpaid household work, using 20 per cent of their daily time compared with 10 per cent contributed by males.

4. Unpaid household work estimates by activity

Table B below shows how the percentage share of unpaid household work spent in each activity varies across the various demographic categories. For instance it shows that the main activities of females are food preparation, child care and housework; and, especially for unmarried females, shopping. Food preparation is also a significant activity for unmarried males, although less so than for unmarried females. The other main activities for males are shopping, home maintenance, car care and gardening.

TABLE B: PERCENTAGE SHARE OF UNPAID HOUSEHOLD WORK SPENT IN EACH ACTIVITY BY SEX, EMPLOYMENT AND MARITAL STATUS

Activity	Female				Male			
	Married		Not Married		Married		Not Married	
	Empl.	U/NILF(a)	Empl.	U/NILF(a)	Empl.	U/NILF(a)	Empl.	U/NILF(a)
Food and drink preparation and clean-up	22.2	26.3	19.8	24.4	13.7	13.8	18.4	23.6
Laundry, ironing and clothes care	12.0	11.1	8.2	9.1	1.9	1.7	5.8	5.0
Other housework	13.5	14.3	12.2	15.6	4.4	5.9	7.7	8.9
Gardening, lawn care and pool care	3.9	5.0	2.8	6.9	13.9	21.8	7.2	9.1
Pet, animal care	12.4	2.3	4.3	4.3	3.4	4.2	5.0	5.4
Home maintenance, improvement and car care	1.7	1.2	3.1	1.7	16.9	16.1	11.2	10.7
Household paperwork, bills, etc.	3.5	2.8	5.0	3.8	5.9	5.9	6.9	4.3
Transport and associated travel	4.6	2.6	2.9	2.0	5.2	3.9	2.1	2.2
Child care	17.3	17.6	8.2	11.5	14.3	5.2	2.3	1.9
Purchasing and associated travel	8.9	16.8	33.5	20.7	20.4	21.5	33.4	28.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) U/NILF — Unemployed or not in the labour force

Table C below shows how the percentage share of the value of particular activities is distributed across males and females by employment and marital status. For instance, it shows that females, particularly married females, contribute to a greater degree than males to the care of children, laundry and food preparation. However, males do a greater share of the home maintenance, car care, gardening, lawn care and pool care.

TABLE C: PERCENTAGE SHARE OF UNPAID HOUSEHOLD WORK CONTRIBUTED TO EACH ACTIVITY BY SEX, EMPLOYMENT AND MARITAL STATUS

Activity	Female				Male				Total
	Married		Not Married		Married		Not Married		
	Empl.	U/NILF(a)	Empl.	U/NILF(a)	Empl.	U/NILF(a)	Empl.	U/NILF(a)	
Food and drink preparation and clean-up	22.0	34.0	5.4	13.2	10.2	6.8	3.6	4.8	100.0
Laundry, ironing and clothes care	31.5	37.9	5.9	13.1	3.8	2.1	3.0	2.7	100.0
Other housework	25.2	34.7	6.3	15.9	6.2	5.4	2.8	3.5	100.0
Gardening, lawn care and pool care	10.0	16.3	2.0	9.6	26.4	27.3	3.6	4.8	100.0
Pet, animal care	15.0	19.4	7.6	14.9	16.4	13.3	6.3	7.1	100.0
Home maintenance, improvement and car care	5.5	5.3	2.8	3.0	42.1	26.5	7.4	7.4	100.0
Household paperwork, bills, etc.	17.5	18.2	6.7	10.3	21.7	14.4	6.7	4.5	100.0
Transport and associated travel	27.8	20.1	4.9	6.8	23.4	11.7	2.5	2.8	100.0
Child care	27.5	36.5	3.6	10.0	17.0	4.1	0.7	0.6	100.0
Purchasing and associated travel	18.9	21.9	9.3	11.3	15.3	10.6	6.7	6.0	100.0

* U/NILF - Unemployed or not in the labour force

5. The production boundary in the SNA and unpaid work

The 1993 SNA discusses the relationship between total unpaid work and the production boundary. The general production boundary is defined as "(activities) carried out under the control and responsibility of (institutional units) that use inputs of labour, capital and goods and services to produce outputs of goods and services."²

The measured production boundary in the 1993 SNA is more restricted than the general production boundary. It includes the following activities within its production boundary:³

- the production of all individual or collective goods and services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services;
- the own-account production of all goods that are retained by their producers for their own final consumption or gross capital formation; and
- the own-account production of housing services by owner-occupiers and of domestic and personal services produced by employing paid domestic staff."

Like its 1968 predecessor, the 1993 SNA excludes from the measured production boundary all own-account production of services within households (which this paper has defined for clarity as "unpaid household work"), while it includes part of the production of volunteer and community work, i.e. the paid labour component of output and purchases of goods and services used by non-profit institutions serving households (NPISHs), valued at their cost of production. Each of these will be considered in turn.

5.1. *Own-account production of services (unpaid household work)*

The 1993 SNA lists those domestic and personal services for which no entries are recorded in the accounts when they are produced and consumed within the same household:⁴

- (a) the cleaning, decoration and maintenance of the dwelling occupied by the household, including small repairs of a kind usually carried out by tenants as well as owners;
- (b) the cleaning, servicing and repair of household durables or other goods, including vehicles used for household purposes;
- (c) the preparation and serving of meals;
- (d) the care, training and instruction of children;
- (e) the care of sick, infirm or old people;
- (f) the transportation of members of the household or their goods."

Several arguments are developed to justify the exclusion of these services from the 1993 SNA production boundary:⁵

- The decision to produce for own consumption is necessarily made at the time production takes place, since services are consumed as soon as they are produced, whereas this may not be the case for goods, which may be marketed some time after they are produced.
- Since services for own account cannot be marketed, it is very difficult to set a meaningful price on them.
- The inclusion of own-account services within the production boundary would define nearly all the adult population as economically active, and eliminate unemployment, thereby rendering labour force statistics meaningless for economic policy purposes.

5.2. *Volunteer and community work*

In looking at the relation of volunteer and community work to the 1993 SNA boundary of production, several points must be noted. First, such work can be undertaken by an individual or group of individuals acting on their own initiative. Alternatively, such work can be done via non-profit institutions serving households. These are defined as non-profit institutions which provide goods and services to households free or at prices which are not economically significant (see Appendix 1 for detailed definitions).

The output of the first category above is not included in the 1993 SNA boundary of production because, at present, there is no way of capturing such activity which occurs within and between households. However, the value of the output of the second category is included within the economic boundary of production in the existing Australian national accounts framework. The 1993 SNA recommends it should be valued by its costs of production and be recorded in the production account under "other non-market output of NPISHs".⁶ The costs of production include the wages paid to the salaried employees of the non-profit institution and its purchases of goods and services.

In the context of an expanded boundary of production, part of the costs of production would also include an imputation for the value of labour supplied free to NPISHs. This imputation, together with one recorded for labour supplied free under the first category, constitutes the value of volunteer and community work calculated in this study.

5.3 *Unpaid work and satellite accounts*

The 1993 SNA recommends that the boundary of production could be extended by incorporating unpaid household work and voluntary and community work in so-called "satellite accounts".⁷ These are accounting statements which are separate from, but consistent with, the existing national accounts. They provide supplementary information which can be used in conjunction with the data in the main accounts. The 1993 SNA suggests that such a satellite analysis could be presented in the form of an input-output table.⁸

It should be noted that, in the satellite accounts, the boundary of production would be extended to include the value of the unpaid labour component of both unpaid household work, and of the unpaid volunteer and community work of NPISHs and of people acting on their own initiative. The unpaid labour component of unpaid household work can be considered to be a proxy for the output of such work.

The ABS supports the development of such specialised accounts as part of the 1993 SNA, and is working towards the development of satellite accounts for Australia incorporating estimates of the value of total unpaid work.⁹ Their

timing, frequency and quality will depend on the availability of appropriate source data and the resolution of what are accepted internationally as very difficult methodological issues. As will be apparent from the description of the methodologies used, a critical requirement for future estimates of the value of the labour input component is data from *time use surveys*. The usefulness of satellite accounts comes partly from having a time series of data so that changes over time can be examined. At present, only one full time use survey has been run in Australia. The next survey is proposed to be run for 1997. It is expected to be largely the same as the 1992 survey in terms of scope and coverage.

Although much research has gone into the issues of measuring total unpaid work there are no established international guidelines.¹⁰ Many of the practical problems of measurement are described in this paper. In estimating total unpaid work for inclusion in satellite accounts the important practical issues relate to the definition, scope and valuation of unpaid household work and volunteer and community work. A range of activities which theoretically satisfy those definitions has been identified for inclusion in the estimates. Depending on the purpose of study, the range of activities appropriate for satellite accounts could be more narrowly defined or expanded to include, for example, travel to and from work or unpaid work done at home for one's paid employment.

6. Definition and scope

A prerequisite for the measurement of total unpaid work is a satisfactory definition of what constitutes such work. The boundary between economic and non-economic activity is not clearly distinguishable in households in a wide range of cases particularly where a business is conducted from home. In addition, the distinction between work and leisure is often very difficult to draw.

A widely accepted principle for determining the scope of total unpaid work is the "third person" or "market replacement" criterion originally stated by Reid in 1934, and quoted by many writers:

"Household production consists of those unpaid activities which are carried on, by and for the members, which activities might be replaced by market goods or paid services, if circumstances such as income, market conditions and personal inclinations permit the service being delegated to someone outside the household group".¹¹

Under this criterion a household activity would be considered as unpaid work if an economic unit other than the household itself could have supplied the latter with an equivalent service.

Arguments can be made for and against the inclusion and exclusion of activities selected as unpaid work. Many household activities, for example cooking and shopping, could be considered to be leisure activities in a number of circumstances, in which case they could be dropped from the list of productive activities. Travel to/from work has been excluded because it is not possible to hire someone to travel to work on one's behalf. Furthermore, the work done out of hours, for example, telephoning clients, is unpaid but it is frequently a necessary part of the job and has therefore been placed with paid activities. The unpaid assistance provided by relatives and others in family businesses is generally grouped with (paid) labour force activities.

Caring for others, for example playing with children, from some perspectives is a debatable inclusion in unpaid household work, even though it satisfies the third person criterion. There is much subjectivity about the way people perceive the status of these activities. Some people would view the raising of children as unpaid work while others would view it as something more akin to leisure. Some would argue that these caring activities should not be classified as work or leisure but something else - they are activities that satisfy biological and cultural codes of behaviour to ensure desirable outcomes for the whole of society. As such, they do not fit into any of the categories used in the 1992 Time Use Survey. Despite these reservations this paper will continue to include caring in the scope of unpaid household work, with the caveat that the delineation between paid work, unpaid work and leisure is still subject to world-wide debate and refinement. In principle, there are insurmountable problems inherent in drawing a clear distinction between work and leisure in a lot of activities. There is no international agreement at the moment on where the dividing lines should be but it is possible that some delineation will ultimately be decided on. Inevitably, any such delineation will be somewhat arbitrary.

The 1992 Australian Time Use Survey used essentially the same classification as that used for the 1987 Pilot Time Use Survey conducted in Sydney. The classification used in 1987 was modelled on the one used in the Canadian Time Use Pilot Study of 1981, itself an adaptation of the classification developed by Szalai¹² in the 1960s which still remains a de facto standard for time use studies. Extensive work is currently being carried out to develop an international standard classification.

For the purpose of deriving estimates of total unpaid work in this paper, the following activities, covering both unpaid household work and volunteer and community work, are included:

<i>Unpaid household work activities</i>	<i>ABS 1992 Time Use codes</i>
<i>Housework</i>	
Food and drink preparation, and clean-up	110-113
Laundry, ironing and clothes care	120-126, 129
Other housework	100, 130
<i>Other domestic activities</i>	
Gardening, lawn care and pool care	140-144, 149
Pet/animal care	145
Home maintenance, improvement and car care	150-157, 159
Household paperwork, bills, etc.	160-164, 169
Providing transport for other household members	183-184
Associated travel (not elsewhere included)	180-182
<i>Child care/minding</i>	
<i>Own children</i>	
Physical care and minding	210-214, 216-219, 246-249, 250-254
Care for sick or disabled	256-259
Teaching, helping, reprimanding	220-224, 226-229
Playing, reading to, talking to	230-234, 236-239
	240-244
<i>Other children</i>	
Physical care and minding	215, 255
Care for sick and disabled	225
Teaching, helping, reprimanding	235
Playing, reading to, talking to	245
Associated travel	280-284
<i>Purchasing goods and services</i>	
Goods	310-315, 319
Services	320-322, 327-329,
Associated travel	380-382
<i>Volunteer and community work</i>	
Helping/caring for sick, frail or disabled relatives	611
Helping/caring for sick, frail or disabled other persons	610-612
Voluntary community activities	630-632
Helping/doing favours for others	620
Associated travel	680-684

The issue of whether to include volunteer and community work as part of total unpaid work is a contentious one. Some commentators have raised the issue of whether volunteer and community work is indeed "work" or whether it is leisure or (most probably) contains elements of both to a greater or lesser extent depending on what type of volunteer and community work it is. On most measures, helping to care for sick, frail or disabled adults would be more like unpaid work, i.e. it can be done by a third person. On the other hand, spending time doing community activities, for example, organising and attending rehearsals for a school play, contains a strong leisure component and in practice one would not hire someone else to undertake these activities on their behalf.

Statistics Canada¹³ looked at the issue of which unpaid activities constituted household work in 1986. (It was decided that playing with children, pet care, shopping and gardening were arguable exclusions because they also contain elements of leisure.) It was also suggested that volunteer and community work be excluded on the basis that it was more like leisure than work. This position has been maintained by Statistics Canada¹⁴ in the study of the value of household work in Canada in 1992. Also excluded from the scope of the 1992 Canadian study of household work are the activities of child-bearing, emotional support, problem or dispute resolution in families, hobbies and crafts, looking for a job and commuting to and from paid work.

It is interesting to note that, in an article by Brathaug on time-use studies, the Norwegian Central Bureau of Statistics defines volunteer work, such as participation in organisations and publicly elected positions as leisure activities "even though they may perhaps be said to fulfil the third person criterion".¹⁵ However, under the broad category of "Care", activity which could be characterised as volunteer work (in the form of the supervision and general care of adults and help provided to other households) is included in their definition of household production.

In the 1990 ABS paper on total unpaid work, volunteer and community work, irrespective of its status in relation to the production boundary, was valued in a similar manner to unpaid household work because of user interest and was justified on the principle that all volunteer work could be performed by a third party. In this study, volunteer and community work is again included for comparative purposes with the previous estimates.

One important point concerns the own-account production of goods by households which, unlike the own-account production of services within households, is included within the measured boundary of production. An exhaustive list of goods producing activities within households is included in the 1993 SNA. The ABS already makes an imputation for the market value (less the input costs) of the more common types of such production in Australia (fruit, vegetables, eggs, beer, wine and meat) for inclusion in estimates of private final consumption expenditure. For 1991-92 this amounted to around \$900 million. Given that the estimates of unpaid work in this paper include an imputation for the labour input component of "gardening and lawn care" activities, it could be argued that an element of double counting is occurring.

However, the extent of this double counting is relatively minor compared with the total value of unpaid work. Further, at this stage it cannot readily be eliminated. The Time Use Survey includes a separate code for harvesting and collecting fruit, vegetables, etc, but this is the least significant component of the own-account production of such goods. The majority of this production involves tasks such as preparation and maintenance of soils, pens, etc, and nurturing of growth of the home-produced goods. It is not possible to obtain estimates of the own-account component of these activities from the more general categories within the 1992 ABS Time Use codes 140-143, 149 "gardening and lawn care".

Some international comparisons of estimates of unpaid work are presented in Appendix 2. To enable direct comparisons of alternative estimates, which apply to different reference periods and are calculated in the currencies of individual countries, they are presented as a percentage of national accounting aggregates - gross domestic product (GDP), or gross national product (GNP) (where estimates expressed as a percentage of GDP are unavailable). The comparisons are based on the estimates as published by statistical agencies and individual authors. No adjustment for methodological differences has been attempted. For example, the 1981 Canadian estimates exclude volunteer and community work (which was equivalent to about 8 per cent of the Australian estimates of unpaid work in 1992); the US estimates are for those persons aged 18 and over, while New Zealand estimates include persons aged 12 years and over, compared with the Australian survey scope of persons aged 15 and over; the French estimates of net opportunity cost are simply net of income tax, compared with the 1992 Australian study which is net of some other taxes and work-related expenses also but includes the concept of "imputed" income by way of employers' on-costs. Murphy (1982) has a similar concept to the Australian net opportunity cost measure in his "net compensation" measure but uses somewhat different tax, on-cost and work-related expenses concepts.¹⁶

Country differences in the valuation of unpaid work are not surprising given the differences in reference periods used, wage rates, wage rate relativities and workforce participation as well as in other social, cultural, climatic and economic conditions prevailing in various countries. The estimates presented for Australia represent a higher proportion of GDP than those for other countries included in the comparison. This reflects, in part, methodological differences such as those noted above. It may also be attributable to cultural factors - for example, a high level of home ownership in Australia and the predominance of detached housing with gardens. The later reference period for the Australian estimates may also capture the greater impact of social and economic trends in all developed countries affecting unpaid work. Trends in household formation may also be significant.

Table D below compares unpaid household work as a percentage of GDP for three countries which have recently produced estimates of the value of unpaid work. The Australian estimates of unpaid household work below are equivalent to total unpaid work less unpaid community and volunteer work. No further adjustments have been made to allow for differences in scope and valuation methods used by the three countries.

TABLE D: COMPARISON OF ESTIMATES OF UNPAID HOUSEHOLD WORK AS A PERCENTAGE OF GDP FOR AUSTRALIA, CANADA AND NEW ZEALAND

<i>Estimation method</i>	<i>Country and year of estimates</i>		
	<i>Australia 1992</i>	<i>Canada 1992</i>	<i>New Zealand 1991</i>
Individual function replacement cost	53	41	52
Housekeeper replacement cost	49	n.a.	43
Opportunity cost — gross	64	46	n.a.
Opportunity cost — net	48	31	n.a.

n.a. — not available

7. Valuation methods

In the literature there are two basic approaches to measuring unpaid work: the "direct" or "output" method; and the "indirect" or "input" method. The first method involves the measurement of output by direct observation of prices and requires data on the quantities of services produced (see Appendix 3 for a more detailed discussion). This method is considered to be conceptually superior because it adopts the same approach as that used to value market production and is therefore appropriate at the macro-economic level for comparisons with national accounting aggregates. At present the ABS does not collect the data required to calculate estimates of the value of total unpaid work using this method and hence the "indirect" or "input" method has been used.

The "indirect" or "input" method was also the method used for the experimental estimates of the value of total unpaid work for 1986-87. It involves valuing output in terms of the cost of inputs and requires information about the time spent on household work, which is provided by Time Use Surveys. It is conceptually similar to the approach adopted in the SNA for valuing other non-market output, for example, non-market services produced by government. Two broad approaches to the input method exist:

1. *Market replacement cost method*, i.e. what it would have cost households to hire someone and pay them to do the household work in their place. Two variants of this approach are:

- (a) individual function replacement cost; and
- (b) housekeeper replacement cost.

2. *Opportunity cost method*, i.e. what household members would have earned had they spent the same amount of time on paid work as spent on unpaid work. Two variants of this approach are:

- (a) gross opportunity cost; and
- (b) net opportunity cost.

Each of these four methods is discussed in detail in the following subsections.

7.1. Individual function replacement cost

The *individual function replacement cost* method is the method currently preferred by the ABS. It assigns values to the time spent on household production by household members according to the cost of hiring the market replacement for each individual function. Thus, for example, time spent on cleaning would be valued using a rate of pay for commercial cleaning, child minding according to the rate of pay for child care workers, etc. This method depends on the key assumption that household members and market replacements are equally productive in their work activities.

However, it is not easy to assign an appropriate market rate of pay to the corresponding household activity because commercial rates may embody a level of skill, responsibility or capital not required or reflected in household production. To take an example, it would obviously be inappropriate to value the time spent on all household production in the form of cooking at the rates paid in the market to professional chefs. The application of commercial rates will also be inappropriate where there are differences in productivity between household and market sectors due to economies of scale or the availability of expensive equipment in commercial operations.

For children aged 15-18 years (in scope of the Australian Time Use Survey) the market wage rate is theoretically too high to apply to this group who generally would receive juvenile wages. However, the distortion is likely to be very small as this group does very little unpaid work.

The market replacement principle does not indicate "who" these replacements should be, i.e. by sex, employment status, etc. In this paper valuation is based on a "persons' wage rate". All replacements are assumed to be working full time, non-managerial and to be a composite of so called "equivalency" groups, i.e. several occupations, each of which entails tasks similar to the matched household activities.

In practice it is difficult to identify exact matches between household work activities and occupations. For Australia, the matches which have been made are shown in Table E below.

TABLE E: OCCUPATIONS MATCHED TO HOUSEHOLD WORK ACTIVITIES

Time Use Category		ASCO Code(a)	ASCO description
<i>Unpaid household work activities</i>			
<i>Housework</i>			
110	Food and drink preparation and clean-up	4703	Bakers and pastrycooks
		4705	Cooks
		4799	Other foodpersons
		8919	Kitchenhands
120	Laundry, ironing and clothes care	8917	Laundry workers
		4911	Garment tradespersons
130	Other housework	8301	Cleaners
<i>Other domestic activities</i>			
141	Gardening, lawn care and pool care	4801	Nurserymen/women
		4803	Greenkeepers
		4805	Gardeners
		8205	Nursery and garden labourers
142	Pet/animal care	4931	Animal trainers
		8999	Other labourers and related workers
143	Home maintenance, improvement and car care	4401	Carpenters and joiners
		4405	Painters, decorators and signwriters
		4601	Vehicle mechanics
144	Household paperwork, bills	5301	Accounting clerks
		5305	Statistical and actuarial clerks
		5401	Supervisor, library and filing clerk
		5499	Other filing, sorting and copying clerks
		5101	Office secretaries and stenographers
150	Providing transport for other household members	7103	Automobile drivers
180	Associated travel (n.e.i.)	7103	Automobile drivers

(a) Australian Standard Classifications of Occupations

The resulting estimates will under- or over-estimate the contribution of unpaid work to GDP depending on the relationship of the productivity of the household and the market. This point is noted by Fitzgerald and Wicks.¹⁷ If households and market producers are equally productive, the replacement cost approach undervalues by ignoring the contribution of non-labour inputs (e.g. capital). If households are less productive, (if they have, say, access to less capital), the extra time used by the less productive household members tends to overvalue the replacement cost estimate.

7.2. Housekeeper replacement cost

The *housekeeper replacement cost* method values the time spent on household work by household members according to the cost of hiring a housekeeper to undertake the relevant tasks. In preparing estimates using this approach some adjustments should be made, in concept, for household tasks not normally undertaken by a housekeeper.

The key assumption is that household members and housekeepers are equally productive in household work, which may or may not be true. For example, a housekeeper is likely to be more productive at cleaning than a household member who may also be looking after small children. Alternatively, a housekeeper may clean more quickly but less thoroughly than the household member. Furthermore, a housekeeper may be both more thorough and quicker than the household member or vice versa.

Two options for preparing such estimates are identified in the literature. The first option, the one used in this paper, is to use a housekeeper wage rate to value all household tasks including those not normally undertaken by a housekeeper. This approach avoids a separate valuation of those tasks not normally performed by a housekeeper, as is required in the second option below. The decision on excluded tasks, in any event, is somewhat arbitrary. (In the Australian context, the tasks of the housekeeper not included in the Australian Standard Classification of Occupations (ASCO) are the domestic activities of gardening, pool care, lawn care, chauffeuring, and shopping.)

The second option is to use the housekeeper wage rate to value all hours of household work, but to adjust the wage rate to reflect the tasks not undertaken by the housekeeper. This approach is used in the US study (refer Murphy, 1982)¹⁸ where the adjusted housekeeper wage rate used covered a wider range of domestic employees than housekeepers, (eg, nannies, chauffeurs, gardeners, cleaners and cooks). An alternative approach within this option is to apply the housekeeper wage rate to those tasks normally carried out by a housekeeper and to value tasks not normally carried out by a housekeeper using the *individual function replacement cost* approach.

The appropriate wage rate to use in this method for Australia is the housekeeper wage rate (ASCO code 8915) in *Distribution and Composition of Employee Earnings and Hours, Australia*, (ABS Catalogue No. 6306.0) Table 14. In this paper a "persons' rate" was used. The definition of ASCO 8915 does not include the wider range of domestic employees as used in the American case. It consists of two categories:

- 8915-11 Executive housekeeper
- 8915-13 Domestic housekeeper.

The tasks of the first category consist of supervising and co-ordinating the activities of workers engaged in cleaning hotels, motels, lodging houses and similar establishments.

The second category consists of performing the cleaning and housekeeping tasks in private homes. The tasks include:

- purchasing food and other supplies
- preparing and cooking food according to employers' instructions or own methods
- serving meals and refreshments
- caring for and supervising children or assisting parents in caring for children
- washing dishes, kitchen utensils and equipment
- sweeping and washing floors and vacuuming carpets, curtains and upholstered furnishings
- dusting and polishing furniture, and cleaning mirrors, bathrooms and light fixtures
- washing and ironing garments, linen and household articles
- changing linen and making beds
- answering doorbells and telephones, and taking messages.

Although the home manager could be said to perform the tasks of the executive housekeeper as he/she organises the tasks of other members of the household, the vast majority of tasks would be undertaken as classified under the domestic housekeeper category. It could be expected that the executive housekeeper would receive a higher wage for the responsibility of supervision. It is not possible, however, to obtain separate wage rates for the two categories within ASCO 8915. Therefore, the estimates using this rate may be slightly higher as a result. However, they are likely to be biased downward overall as the earnings data for housekeepers from 6306.0 do not include any income-in-kind they may receive through their employment.

For this method to be directly comparable with the other methodologies used to calculate the value of total unpaid work, the *housekeeper replacement cost* estimates (which estimate only the unpaid household work component) have been added to estimates of volunteer and community work based on the *individual function replacement cost* method, using the "persons' wage rate".

7.3. Gross opportunity cost

The *gross opportunity cost* method values unpaid work in terms of the earnings foregone by devoting time to unpaid work rather than to paid employment. The theoretical basis of this approach is the assumption that the value of time spent doing unpaid work at home equals its "opportunity cost" elsewhere, i.e. the valuation of the next best alternative use. The assumption utilised is that the worker has given up paid work in order to perform unpaid work and that its value is equal to the individual's marginal hourly wage in the market. In other words, to do an extra hour of unpaid work, an hour of paid (market) work is given up. In practice the method uses the total time spent on unpaid work and the average wage applicable for each group in the population. There are so many problems with this approach which, unless certain strict conditions apply, make practically meaningless any estimates of the value of total unpaid work that it produces. Some reservations with this approach are as follows:

1. *Labour market structures.* The gross opportunity cost method does not represent the way the choice between paid and unpaid work is made. Most workers have limited choice in the short run in the hours they have to work and few have the option to refuse overtime. Therefore, by doing unpaid work after the standard working week they are giving up leisure instead of paid work. The opportunity cost is not then the wage they receive in the market but the value

they place on leisure. This value can be greater than or less than the value of work depending on the person's attitude to work. If overtime rates reflect supply and demand in the labour market, and they are greater than average wage rates, then the implication is that workers value an extra hour of leisure above an extra hour of paid work. It is not valid, therefore, to use the hourly wage rate at the margin as being representative of the opportunity cost. In theory, the wage rate can be used if work hours can vary without limit but at present this is not an option for the vast majority of workers.

2. *Employment status.* This method does not hold up well when other patterns of labour force participation, other than a rigid fixed hours working week, are considered. For example, what if someone can take an hour off without losing pay? Does this mean that their unpaid work is valued at zero? What is given up by doing unpaid work on the weekend if one works at paid work during the week? The answer is leisure, not paid work. What about the retired?

In particular, what about the unemployed or those not in the labour force? What do they give up? With respect to the unemployed, their opportunity cost of doing unpaid work is either leisure, time spent searching for work or retraining. Because a large number of unemployed persons receive a benefit irrespective of how they spend their day, the opportunity cost to them of doing unpaid work might be zero or might even be negative (if the costs of searching for work or expenses associated with retraining are considered). Doing unpaid work prevents them from searching for work and would probably cost money in terms of research, transport and clothes.

3. *"Psychic income".* A probably unquantifiable but theoretically precise valuation would take account of the worker's net psychic income from doing unpaid work and from doing paid work, i.e. where the net psychic benefit equals psychic benefit from doing unpaid work minus psychic benefit from paid employment. Net psychic benefit must be at least as great as the opportunity cost in order to move a person to perform unpaid work in preference to paid employment. This leads back to the issues discussed in Section 6 as to whether some of the "work" in unpaid work is in fact work or leisure. Some examples here include whether child care and shopping are work or leisure – it may depend on the individual's perception.

4. *Estimates produced.* Hawrylyshyn states that the main disadvantage of the gross opportunity cost method relates to the determination of the opportunity cost of an unpaid worker. It is not necessarily the wage. He gives the example of two unpaid workers identical in relation to house, family size and all other factors except that one could earn an hourly wage 2.5 times that of the other. The method would therefore tell us that the value of one's unpaid work is 2.5 times that of the other, an unrealistic concept.¹⁹ Even if it is the "foregone wage" that is of interest, how is this determined when an unpaid household worker has had no market employment and therefore an indeterminable potential wage?

Opportunity cost measures tend to be biased upward when compared with the housekeeper replacement cost method because wages for professional housekeepers are lower than the economy-wide average as used in the opportunity cost method.

In view of the above discussion, the opportunity cost method will be valid only if very strict assumptions apply, i.e.

- (a) at the margin, time devoted to unpaid work precludes market work,
- (b) on average, the value of time at the margin is gross hourly wages,
- (c) the average potential hourly earnings of the not-employed are equal to the average of the hourly earnings of the employed.

The second assumption means that individuals do not take taxes into account when determining opportunity costs, clearly an unrealistic notion. The next section therefore discusses a more plausible opportunity cost estimate.

7.4. Net opportunity cost

The decision to undertake paid work as an alternative use of time to unpaid work could reasonably depend on the remuneration (wages and salaries, superannuation and fringe benefits) after tax and any work-related costs. The net opportunity cost approach recognises this and the method values unpaid work at:

"the after tax hourly wage rate less work-related expenses plus income by way of employer costs of superannuation and fringe benefits".

The rationale is that the unpaid worker will be equating the value of doing unpaid work with the net benefit of working in paid work conferred by this "adjusted" hourly wage rate.

In the Australian context, estimates of the wage rate applicable to a *net opportunity cost* valuation were derived by subtracting from average annual ordinary time earnings, the relevant tax payable, medicare levy and work-related expenses, adding imputed employer on-costs and then converting the result to an hourly wage rate.

Average weekly ordinary time earnings and hours worked were obtained from ABS Catalogue No. 6306.0. Taxation rates were obtained from the Australian Taxation Office. Employer on-costs were compiled from ABS sources, mainly *Labour Costs, Australia* (Catalogue No. 6348.0). Work-related expenses were calculated from data classified by type of family and number of dependent children and employment structure within each family from the Household Expenditure Survey. The idea was to work out how much extra expenditure is incurred when a person works instead of doing unpaid work at home or in the community.

It should be noted that the calculation of the after-tax, etc. opportunity cost rate is really only a first round attempt to find the appropriate and most realistic wage rate. Ideally, a number of other factors should also be taken into account, if it were possible to measure them (but this is an enormous task). For example, in the Australian context, if the partner in a relationship stays at home, there is the issue of the dependent spouse rebate. If there are children, depending on the income earned, there is the family allowance and family income supplement, the medicare levy phaseout, subsidised housing and a range of government means tested welfare programs. Indeed the opportunity cost of working in the paid workforce could well be negative in some cases.

However, given the lack of data to sort out such a complicated concept, the simplified after tax, etc. *net opportunity cost* hourly wage rate as outlined and calculated above was used. There is a considerable difference between the *gross opportunity cost* value and the *net opportunity cost* value, though of course it does depend to an extent on the assumptions relating to on-costs and, in particular, work-related expenses.

The hourly wage rates used for the "opportunity cost" method were \$14.34 per person for the *gross opportunity cost* method and \$10.87 for the *net opportunity cost* method.

The use of the after-tax etc. opportunity cost hourly wage rate reduces the value of total unpaid work compared with the value yielded by the gross opportunity cost hourly wage rate. In the previous ABS paper and in this paper the latter method gave the highest estimates for the value of total unpaid work of all the valuation methods.

8. Input data for the estimates

The preparation of estimates of total unpaid work presented in this paper for the input methods required three sets of data, namely, estimates of average time spent on household work obtained from the Time Use Survey, population estimates and appropriate wage rates.

Annual estimates of the value of unpaid household work were derived for each demographic subgroup by expanding average daily minutes to derive average weekly hours spent on unpaid household tasks. The hourly wage rate appropriate to each estimation methodology was applied to the average weekly hours to obtain an estimated value of unpaid household work in a week. These average amounts were then multiplied by the number of weeks in the year, applied to the population in each demographic subgroup and summed to provide annual estimates of the value of unpaid household work. The same methodology is applicable to volunteer and community work. (An algebraic model of the derivation of estimates of total unpaid work is provided in Appendix 4.) The addition of estimates of unpaid household work and volunteer and community work gives the value of total unpaid work.

8.1. Time Use Surveys

To date, Time Use Surveys have provided the principal statistical base for deriving estimates of the value of total unpaid work in Australia. These surveys examine how people allocate time to different kinds of activities in relation to demographic, socio-economic and other personal characteristics.

The first attempt in Australia to quantify the size of the total unpaid work was facilitated by the 1987 ABS Time Use Pilot Survey (see *Information Paper: Time Use Pilot Survey May-June 1987*, ABS Catalogue No. 4111.1 for details). That survey, conducted over the period 23 May to 4 June 1987, covered about 800 private dwellings equating to over 1600 individual responses of persons aged 15 years and over in the Sydney Statistical Division. Experimental estimates of the total value of unpaid work for 1986-87 were published by the ABS in February 1990 (see *Information Paper: Measuring Unpaid Household Work - Issues and Experimental Estimates*, ABS Catalogue No. 5236.0). The objective of that study was to estimate the dollar value of labour inputs to total unpaid work in Australia in 1986-87, and compare its size with that of production as measured by gross domestic product (GDP). The opportunity was also taken to further develop the methodology underlying the unpaid work estimates.

The ABS ran the first national Time Use Survey in 1992 (which expanded the geographic coverage of the May/June 1987 Time Use Pilot Survey and extended the time frame from a fortnight to cover each quarter in a full year). The national survey, conducted over a fortnightly period in February/March, May/June, August/September and October/November, covered approximately 4400 households across Australia, and close to 8300 individual questionnaires. All persons aged 15 years and over in the selected households were surveyed about their use of time for a 48 hour period except members of the permanent defence forces and overseas residents. Questions about childrens' contributions to productive activity in households were out of scope.

8.2. Wage rate data

The wage rate data used in this study are averages for the whole of Australia for all persons. The ABS series used were obtained from *Distribution and Composition of Employee Earnings and Hours, Australia*, (ABS Catalogue No. 6306.0), published annually, the relevant publication being that for May 1992. The advantage of this publication over sources used in the first set of estimates of the value of total unpaid work (*Average Weekly Earnings of Employees, Australia*, (ABS, Catalogue No. 6304.0) and *Award Rates of Pay Indexes, Australia*, (ABS, Catalogue No. 6312.0)) is that the data are available at the 4 digit ASCO level which permits more appropriate occupations and their accompanying wage rates to be chosen for the main activity groups. The hourly wage rates have been calculated from the average weekly ordinary time earnings and the hours paid for each ASCO occupational group.

It should also be noted that, in the 1986-87 statistics, it was recognised that estimates of total unpaid work based on award wage series could be understated to the extent that actual earnings exceeded award rates of pay. Therefore, alternative estimates were prepared for the *individual function replacement cost* approach adjusting award wage rates for individual occupations using the difference between award and average rates for "all occupations". However, these series are no longer available in these forms as the institutional framework for setting wages has changed. Since 1986-87 the system has moved away from one of centrally fixing wages to a more decentralised system and the wage rates published cannot be separated into minimum and paid rates for each occupation.

Appendix 5 contains an explanation of the wage rates used for the *individual function replacement cost* method.

Time spent on volunteer and community activities was valued using an average wage rate for all occupations because of the difficulty of assigning particular occupations to this category.

8.3. Population data

Population estimates were based on ABS monthly labour force estimates of the civilian population aged 15 and over, by sex, marital status, labour force status and age, benchmarked to the 1986 Population Census. The data have been weighted to the mean of the two labour force benchmarks surrounding the collection fortnight which corresponded to the period when the Time Use Survey was being conducted, i.e. in February/March, May/June, August/September and November/December. It was decided not to calculate estimates by State as the sampling errors were too large for the smaller States.

9. Comparison of Australian estimates for 1986-87 and 1992

A tabular comparison of the value of total unpaid work and its components for 1986-87 and 1992 can be found at Appendix 6.

The value of total unpaid work was typically around 60 per cent higher in 1992 than in 1986-87, depending on the valuation method used. GDP increased by 49 per cent over the same period. As a result, the value of total unpaid work as a proportion of GDP rose by between 2 and 11 per cent over the period, again depending on the valuation method used. The total population grew by 8 per cent over the same period and the number of households increased by 6 per cent.

There was an increase in the share of volunteer and community work, from around 5 to 6 per cent of the value of unpaid work in 1986-87 to about 8 per cent in 1992. While the share of total unpaid work contributed by females was almost identical in both studies (about two thirds of the total), the data show that males and females contributed almost equally to volunteer and community work in 1992.

Many factors account for the changes and these should be considered in making comparisons in respect of the two periods:

- (a) For reasons set out in the following paragraph there are differences in the methodology used in compiling the estimates for the two periods.
- (b) Australia was at different stages of the business cycle in 1986-87 and 1992. The numbers of unemployed persons, and the unemployment rate were both substantially higher in 1992 than in 1986-87. The productivity of

the paid workforce in 1992 differed from that of 1986-87. Comparisons of the proportions of the total value of unpaid work to GDP must take account of these factors.

- (c) Unpaid work is predominantly undertaken by females. To the extent that the proportion of the female population in paid work in 1992 was higher than in 1986-87 there was less opportunity for females to undertake unpaid work in 1992 than in 1986-87.
- (d) Behavioural changes in society (for example, an increasing trend for people to purchase take away meals) will also affect the comparisons.

As noted, there are differences in the methodology used in compiling the estimates for the two periods:

- The 1987 pilot study and the 1992 national survey are not directly comparable. The 1987 study covered only Sydney, while the 1992 survey proportionally represents capital cities and the rest of the State populations. The time frame was also different, with only one particular season represented in 1987 and a whole year in 1992.
- Different wage series and modified methodology were employed to calculate the various representative market wage rates.

10. Primary versus simultaneous activities

In the 1987 Pilot Time Use Survey, only primary activities were recorded. In the 1992 Time Use Survey, to provide an understanding of the amount of simultaneous activities being performed, respondents were asked to write all their activities being undertaken at a particular time in their diaries. A primary activity referred to persons' descriptions on the first diary column of what they considered was their main activity. If the description occurred in diary column 2, it was stored as the item secondary activity. If more than one other activity was reported, the second extra one was stored as the item tertiary activity. It was found that, for a significant proportion of the time during which unpaid household work was being performed, a number of secondary and tertiary activities were also being performed. A particularly significant secondary or tertiary activity was child care.

The estimates of the value of unpaid work contained in Tables 1-7 have been based on primary activities only as in 1986-87. The impact of secondary and tertiary activities has been examined using tables calculated for the *net opportunity cost* method. The results of these calculations are summarised in Table F below.

Three of the four columns in Table F below have been valued using the full wage rate. It could reasonably be argued, however, that if a person were to engage in two activities simultaneously his/her productivity in one or all of the activities might be reduced. The reduction in productivity would vary depending on the combination of activities being performed. Thus it might be possible to mind children and cook a meal at the same time with no reduction in the time taken to cook the meal, but a reduction in the quality of the child minding being provided.

The final column is based on the assumption that the productivity of providing the secondary activities is halved. To reflect the reduction in productivity the wage rate of these activities is halved. Of course there would be some combination of activities for which productivity is reduced considerably, whereas with others there might be no reduction: the example is therefore indicative only.

To the extent that housekeepers also undertake secondary and tertiary activities such as child care and are paid a "full" wage rate for doing so irrespective of the level of productivity achieved for each activity, it could be argued that this type of estimation is not particularly appropriate or useful.

TABLE F: UNPAID HOUSEHOLD WORK - PRIMARY AND OTHER ACTIVITIES(a)
(net opportunity cost valuation)

	<i>All activities, including other full wage</i> (\$ billion)	<i>Primary activities full wage</i> (\$ billion)	<i>Other activities</i>	
			<i>Full wage</i> (\$ billion)	<i>Half wage</i> (\$ billion)
Value of unpaid household work, Australia, 1992	286.2	190.2	96.0	48.0

(a) "Other activities" refers to secondary and tertiary activities

11. Conclusion

Further estimates of the value of total unpaid work for Australia using the input method will be compiled when additional time use data from the proposed 1997 Time Use Survey become available. When resources permit, the output method of valuing total unpaid work will be further investigated and, if adequate data can be obtained, some experimental estimates may be produced.

The estimates of total unpaid work presented in this paper include estimates expressed as a percentage of GDP. However, the ABS considers that, for the reasons outlined in Section 5, they should continue to be excluded from the measure of GDP in Australia's national accounts. International practice in this regard will be kept under review, and work on refining and improving the estimates of the value of total unpaid work will continue.

TABLE 1. UNPAID HOUSEHOLD WORK: DOMESTIC ACTIVITIES, CHILDCARE, AND PURCHASING GOODS AND SERVICES, AUSTRALIA, 1992

INDIVIDUAL FUNCTION REPLACEMENT COST ESTIMATION METHOD — PERSONS' WAGE RATE

<i>Sex/ Employment Status</i>	<i>Marital Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Unpaid Household Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE					
Employed	Married	34.66	11.90	2,070	44.7
	Not married	17.13	11.98	1,141	12.2
	Total	28.43	11.92	3,211	56.9
Not Employed	Married	44.56	11.85	2,104	58.2
	Not Married	28.56	11.84	1,376	24.3
	Total	38.23	11.85	3,480	82.5
<i>Employed/</i>	<i>Married</i>	<i>39.65</i>	<i>11.88</i>	<i>4,174</i>	<i>102.9</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>23.38</i>	<i>11.88</i>	<i>2,517</i>	<i>36.5</i>
	<i>Total</i>	<i>33.53</i>	<i>11.88</i>	<i>6,691</i>	<i>139.4</i>
MALE					
Employed	Married	16.44	12.16	3,050	31.9
	Not married	9.96	12.07	1,344	8.4
	Total	14.46	12.14	4,394	40.3
Not Employed	Married	27.94	11.99	1,206	21.1
	Not Married	14.68	11.98	964	8.9
	Total	22.05	11.98	2,170	30.0
<i>Employed/</i>	<i>Married</i>	<i>19.70</i>	<i>12.09</i>	<i>4,256</i>	<i>53.0</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>11.93</i>	<i>12.02</i>	<i>2,308</i>	<i>17.3</i>
	<i>Total</i>	<i>16.97</i>	<i>12.07</i>	<i>6,564</i>	<i>70.3</i>
ALL PERSONS				13,255	209.7

TABLE 2. UNPAID HOUSEHOLD WORK: DOMESTIC ACTIVITIES, CHILDCARE, AND PURCHASING GOODS AND SERVICES, AUSTRALIA, 1992

HOUSEKEEPER REPLACEMENT COST ESTIMATION METHOD

<i>Sex/ Employment Status</i>	<i>Marital Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Unpaid Household Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE					
Employed	Married	34.66	11.14	2,070	41.8
	Not married	17.13	11.14	1,141	11.4
	Total	28.43	11.14	3,211	53.2
Not Employed	Married	44.56	11.14	2,104	54.6
	Not Married	28.56	11.14	1,376	22.9
	Total	38.23	11.14	3,480	77.5
<i>Employed/</i>	<i>Married</i>	<i>39.65</i>	<i>11.14</i>	<i>4,174</i>	<i>96.4</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>23.38</i>	<i>11.14</i>	<i>2,517</i>	<i>34.3</i>
	<i>Total</i>	<i>33.53</i>	<i>11.14</i>	<i>6,691</i>	<i>130.7</i>
MALE					
Employed	Married	16.44	11.14	3,050	29.2
	Not married	9.96	11.14	1,344	7.8
	Total	14.46	11.14	4,394	37.0
Not Employed	Married	27.94	11.14	1,206	19.6
	Not Married	14.68	11.14	964	8.2
	Total	22.05	11.14	2,170	27.8
<i>Employed/</i>	<i>Married</i>	<i>19.70</i>	<i>11.14</i>	<i>4,256</i>	<i>48.8</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>11.93</i>	<i>11.14</i>	<i>2,308</i>	<i>16.0</i>
	<i>Total</i>	<i>16.97</i>	<i>11.14</i>	<i>6,564</i>	<i>64.8</i>
ALL PERSONS				13,255	195.5

TABLE 3. UNPAID HOUSEHOLD WORK: DOMESTIC ACTIVITIES, CHILDCARE, AND PURCHASING GOODS AND SERVICES, AUSTRALIA, 1992

OPPORTUNITY COST ESTIMATION METHOD — GROSS

<i>Sex/ Employment Status</i>	<i>Marital Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Unpaid Household Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE					
Employed	Married	34.66	14.34	2,070	53.6
	Not married	17.13	14.34	1,141	14.6
	Total	28.43	14.34	3,211	68.2
Not Employed	Married	44.56	14.34	2,104	70.1
	Not Married	28.56	14.34	1,376	29.4
	Total	38.23	14.34	3,480	99.5
<i>Employed/</i>	<i>Married</i>	<i>39.65</i>	<i>14.34</i>	<i>4,174</i>	<i>123.7</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>23.38</i>	<i>14.34</i>	<i>2,517</i>	<i>44.0</i>
	Total	33.53	14.34	6,691	167.7
MALE					
Employed	Married	16.44	14.34	3,050	37.5
	Not married	9.96	14.34	1,344	10.0
	Total	14.46	14.34	4,394	47.5
Not Employed	Married	27.94	14.34	1,206	25.2
	Not Married	14.68	14.34	964	10.6
	Total	22.05	14.34	2,170	35.8
<i>Employed/</i>	<i>Married</i>	<i>19.70</i>	<i>14.34</i>	<i>4,256</i>	<i>62.7</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>11.93</i>	<i>14.34</i>	<i>2,308</i>	<i>20.6</i>
	Total	16.97	14.34	6,564	83.3
ALL PERSONS				13,255	251.0

TABLE 4. UNPAID HOUSEHOLD WORK: DOMESTIC ACTIVITIES, CHILDCARE, AND PURCHASING GOODS AND SERVICES, AUSTRALIA, 1992

OPPORTUNITY COST ESTIMATION METHOD — NET

<i>Sex/ Employment Status</i>	<i>Marital Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Unpaid Household Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE					
Employed	Married	34.66	10.87	2,070	40.6
	Not married	17.13	10.87	1,141	11.1
	Total	28.43	10.87	3,211	51.7
Not Employed	Married	44.56	10.87	2,104	53.1
	Not Married	28.56	10.87	1,376	22.3
	Total	38.23	10.87	3,480	75.4
<i>Employed/</i>	<i>Married</i>	<i>39.65</i>	<i>10.87</i>	<i>4,174</i>	<i>93.7</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>23.38</i>	<i>10.87</i>	<i>2,517</i>	<i>33.4</i>
	Total	33.53	10.87	6,691	127.1
MALE					
Employed	Married	16.44	10.87	3,050	28.4
	Not married	9.96	10.87	1,344	7.6
	Total	14.46	10.87	4,394	36.0
Not Employed	Married	27.94	10.87	1,206	19.1
	Not Married	14.68	10.87	964	8.0
	Total	22.05	10.87	2,170	27.1
<i>Employed/</i>	<i>Married</i>	<i>19.70</i>	<i>10.87</i>	<i>4,256</i>	<i>47.5</i>
<i>Not Employed</i>	<i>Not Married</i>	<i>11.93</i>	<i>10.87</i>	<i>2,308</i>	<i>15.6</i>
	Total	16.97	10.87	6,564	63.1
ALL PERSONS				13,255	190.2

TABLE 5. VOLUNTEER AND COMMUNITY WORK, AUSTRALIA, 1992
REPLACEMENT COST ESTIMATION METHOD — PERSONS' WAGE RATE

<i>Sex</i>	<i>Employment Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Volunteer and Community Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE	Employed	1.94	12.17	3,211	4.0
	Not Employed	2.40	12.17	3,480	5.3
	<i>Employed and Not Employed</i>	2.17	12.17	6,691	9.3
MALE	Employed	1.65	12.17	4,394	4.6
	Not Employed	3.07	12.17	2,170	4.2
	<i>Employed and Not Employed</i>	2.10	12.17	6,564	8.8
ALL PERSONS				13,255	18.1

TABLE 6. VOLUNTEER AND COMMUNITY WORK, AUSTRALIA, 1992
OPPORTUNITY COST ESTIMATION METHOD — GROSS

<i>Sex</i>	<i>Employment Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Volunteer and Community Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE	Employed	1.94	14.34	3,211	4.7
	Not Employed	2.40	14.34	3,480	6.2
	<i>Employed and Not Employed</i>	2.17	14.34	6,691	10.9
MALE	Employed	1.65	14.34	4,394	5.4
	Not Employed	3.07	14.34	2,170	5.0
	<i>Employed and Not Employed</i>	2.10	14.34	6,564	10.4
ALL PERSONS				13,255	21.3

TABLE 7. VOLUNTEER AND COMMUNITY WORK, AUSTRALIA, 1992
OPPORTUNITY COST ESTIMATION METHOD — NET

<i>Sex</i>	<i>Employment Status</i>	<i>Weekly Hours</i>	<i>Wage Rate</i>	<i>Population</i>	<i>Value of Volunteer and Community Work</i>
		(hr)	(\$/hr)	('000)	(\$ billion)
FEMALE	Employed	1.94	10.87	3,211	3.5
	Not Employed	2.40	10.87	3,480	4.7
	<i>Employed and Not Employed</i>	2.17	10.87	6,691	8.2
MALE	Employed	1.65	10.87	4,394	4.1
	Not Employed	3.07	10.87	2,170	3.7
	<i>Employed and Not Employed</i>	2.10	10.87	6,564	7.8
ALL PERSONS				13,255	16.0

APPENDIX 1. NON-PROFIT INSTITUTIONS SERVING HOUSEHOLDS (NPISHs)

The 1993 SNA identifies two main types of NPISHs as defined below.

"4.65. The first type consists of NPISHs which are created by associations of persons to provide goods or, more often, services primarily for the benefit of the members themselves. The services are usually provided free, being financed by regular membership subscriptions or dues. They include NPISHs such as professional or learned societies, political parties, trade unions, consumers' associations, churches or religious societies, and social, cultural, recreational or sports clubs. They do not include bodies serving similar functions that are controlled and mainly financed by government units, except that churches are always treated as serving households even when mainly financed by government units. Political parties in countries with one-party political systems that are controlled and financed by government units are always included in the general government sector...

4.67. The second type of NPISH consists of charities, relief or aid agencies that are created for philanthropic purposes and not to serve the interests of the members of the association controlling the NPISH. Such NPISHs provide goods or services on a non-market basis to households in need, including households affected by natural disasters or war. The resources of such NPISHs are provided mainly by donations in cash or in kind from the general public, corporations or governments. They may also be provided by transfers from non-residents, including similar kinds of NPISHs resident in other countries."

APPENDIX 2. INTERNATIONAL COMPARISONS OF ESTIMATES OF UNPAID WORK

<i>Estimation method</i>	<i>Author</i>	<i>Country</i>	<i>Date of study</i>	<i>Reference year</i>	<i>% of GDP or GNP</i>
Individual function replacement cost	Adler and Hawrylshyn	Canada	1978	1971	40 (GDP)
	Murphy	USA	1982	1976	44 (GNP)
	CBS	Norway	1989	1981	39 (GDP)
	Stats. Canada	Canada	1994	1992	41 (GDP)
	NZ Dept. Stats.	New Zealand	1991	1991	52 (GDP)
	ABS	Australia	1990	1986-87	52 (GDP)(a) 57 (GDP)(b)
			1994	1992	58 (GDP)
Housekeeper replacement cost	Adler and Hawrylshyn	Canada	1978	1971	33 (GDP)
	Suivrinta	Finland	1980	1980	32 (GNP)
	Chadeau and Fouquet	France	1981	1975	31 (GNP)
	Murphy	USA	1982	1976	32 (GNP)
	CBS	Norway	1989	1981	44 (GDP)
	NZ Dept. Stats	New Zealand	1991	1991	43 (GDP)
	ABS	Australia	1994	1992	54 (GDP)
Opportunity cost — gross	Murphy	USA	1982	1976	60 (GNP)
	Stats. Canada	Canada	1985	1981	40 (GDP)
	Stats. Canada	Canada	1994	1992	46 (GDP)
	ABS	Australia	1990	1986-87	58 (GDP)(a) 62 (GDP)(b)
			1994	1992	69 (GDP)
Opportunity cost — net	Chadeau and Fouquet	France	1981	1975	44 (GNP)
	Murphy	USA	1982	1976	51 (GNP)(c) 44 (GNP)(d)
	Stats. Canada	Canada	1992	1986	32 (GDP)(e)
			1994	1992	31 (GDP)(e)
	ABS	Australia	1994	1992	52 (GDP)(f)

(a) Award wage rate. (b) Adjusted award wage rate. (c) "After-tax compensation" — Compensation less marginal taxes. (d) "Net compensation" — Compensation less marginal taxes less work related expenses. (e) Average hourly employment earnings net of marginal taxes. (f) Total remuneration after taxes; less work related expenses.

APPENDIX 3. THE INPUT AND OUTPUT METHODS OF VALUING UNPAID WORK

This Appendix draws heavily from the framework developed by Luisella Goldschmidt-Clermont who, in a book entitled "Unpaid Work in the Household", in the Women, Work and Development series published by the International Labour Office in 1982 outlines the advantages and disadvantages of the various estimation methodologies in the valuation of unpaid household work. Her critique is based on reviews of 75 economic evaluations of unpaid work inputs in the household, or of their counterpart, non-market household output. They are discussed from the methodological angle, i.e. according to the method of value imputation.

Goldschmidt-Clermont has prepared a typology of unpaid work evaluation methods. There are four estimation methods which depend on the angle from which the evaluation is approached (input or output) and the units used for the measurement (physical or monetary).

Physical units measuring inputs relate to labour inputs

- number of workers
- number of work hours.

Physical units measuring outputs can be in terms of any household productive activity, for example,

- number of meals served
- number of infants or handicapped persons cared for, etc.

Monetary units do not readily exist for domestic activities as household production for own consumption does not enter the market. Labour is unpaid and the goods and services are not sold. Therefore shadow prices are borrowed from the market: wages for valuing labour inputs and prices when valuing output.

The four estimation methods are:

- measurements expressed in physical units give evaluations of
 - (a) volume of inputs
 - (b) volume of outputs.
- measurements expressed in monetary units give evaluations of the imputed
 - (a) value of inputs
 - (b) value of outputs.

The ABS has valued total unpaid work in this study and in the 1990 study on the basis of the value of inputs. However, the ABS recognises that valuations based on the value of household output may be more useful.

Valuations based on household output

Valuation methods grouped under this heading assess the imputed value of goods and services produced by domestic activities and use as a starting point the prices of market goods or services equivalent to those produced in the household. The end point is the calculation of value added which is obtained as follows:

Value of gross output = volume of household output for different activities times market equivalent prices for each activity

Value of intermediate inputs is based on a survey of household expenditures

Value added in household production = value of gross output less value of intermediate inputs.

This method is therefore appropriate at the macro-economic level for comparisons with national accounting aggregates. Only about six studies based on this methodology exist. This is probably because it is difficult to determine the volume and nature of household production. It is also difficult to select, in the market, equivalent goods and services to be used as a price reference. In short, the data requirements are demanding and, in particular, data may have to be collected on volumes of household outputs.

APPENDIX 4. THE MODEL FOR THE VALUATION OF UNPAID WORK IN AUSTRALIA IN 1992

Algebraically, estimates of the number of hours spent on unpaid work per person in 1992 in Australia are derived as follows (note that 1992 was a leap year, with 366 days):

$$H_{ij} = (MD_{ij}/60)*366$$

where

H_{ij} = average hours in 1992 on unpaid work function i per person in demographic group j

MD_{ij} = average daily minutes on unpaid work on function i per person in demographic group j

For the *individual function replacement cost* method estimates for Australia for 1992 are derived as follows:

$$UWA_R = \sum_{ij} H_{ij}PA_jW_i$$

where

PA_j = number of persons in Australia in demographic group j

W_i = average hourly rate of pay applicable to unpaid work on function i

For the *gross opportunity cost* method, estimates for Australia for the value of unpaid work in 1992 are defined as

$$UWA_O = \sum_j H_jPA_jOCW_j$$

where

OCW_j = opportunity cost average hourly rate of pay applicable to demographic group j

H_j = average hours in 1992 on any unpaid in demographic group j where $H_j = H_{ij}$

The *net opportunity cost* method is the same except read "net" in front of opportunity cost.

APPENDIX 5. WAGE RATES USED FOR THE INDIVIDUAL FUNCTION REPLACEMENT COST ESTIMATION METHOD

The estimates for the *individual function replacement cost* method have been compiled using the wage rates for persons, based on the annual publication, ABS Catalogue No. 6306.0, *Distribution and Composition of Employee Earnings and Hours, Australia*, and are reproduced below. They serve as the basis for calculation of implied average wage rates for the various demographic groups. Variations in these implied average wages arise as a result of different time spent on each activity for each demographic group, which implies different weighting patterns being applied to the separate wage rates.

<i>Activity</i>	<i>Persons' wage rates</i>
	\$/hr
Food and drink preparation, and clean-up	11.66
Laundry, ironing etc.	11.33
Other housework	11.21
Gardening, lawn care and pool care	10.85
Pet, animal care	12.79
Home maintenance, improvement and car care	13.33
Household paperwork, bills, etc.	13.41
Transport and associated travel	12.32
Child care	12.64
Purchasing and associated travel	12.17

APPENDIX 6. COMPARISON OF AUSTRALIAN 1986-87 AND 1992 ESTIMATES

<i>Estimation method</i>	<i>Year of ABS estimates</i>	<i>Wage rate</i>	<i>Value of unpaid household work</i> (\$ billion)	<i>% share of total unpaid work</i> — per cent —	<i>Ratio of value of unpaid household work to GDP</i> — per cent —	<i>Value of volunteer and community work</i> (\$ billion)	<i>% share of total unpaid work</i> per cent	<i>Value of total unpaid work</i> (\$ billion)	<i>Female contribution</i> — per cent —	<i>Ratio of value of total unpaid work to GDP</i> — per cent —
Individual function replacement cost	1986-87	Award	129.0	94	48	8.3	6	137.3	68	52
	1986-87	Adjusted award	141.9	94	54	9.1	6	151.0	68	57
	1992	Person - market	209.7	92	53	18.1	8	227.8	65	58
Housekeeper replacement cost	1986-87	Market (from phone survey)	123.1	94	47	(a)8.3	6	131.4	66	50
			123.1	93	47	(a)9.1	7	132.2	66	50
	1992	Person - market	195.5	92	49	(a)18.1	8	213.6	66	54
Opportunity cost - gross	1986-87	Award	143.3	95	54	8.2	5	151.5	66	58
	1986-87	Average	153.9	95	58	8.9	5	162.8	64	62
	1992	Average - market	251.0	92	64	21.3	8	272.3	66	69
Opportunity cost - net	1992	Average - market	190.2	92	48	16.0	8	206.2	66	52

(a) Estimates using the individual function replacement cost method.

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5. 1993 SNA, para.6.21, pp.125-126.
6. 1993 SNA, para.6.51, p.129 and table 6.1, p.122.
7. 1993 SNA, para.21.120.
8. 1993 SNA, para.21.102, p.503, table 21.5. A column "others" under non-market producers refers to a possible extension of the production boundary to include total unpaid work.
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